

Amendments To Claims

Listing Of Claims

Claims 1-113 (canceled)

114. (currently amended) A method for fabricating semiconductor components comprising:

providing a plurality of semiconductor dice on a substrate having a first side, a second side, and a plurality of die contacts on the first side;

forming a polymer layer on the first side having a plurality of first slots in a criss cross pattern between the dice;

forming an etch mask on the second side having a plurality of second slots aligned with the first slots;

forming a plurality of terminal contacts on the polymer layer in electrical communication with the die contacts; and

etching the substrate from the first side and the second side at a same time forming first grooves in the first side aligned with the first slots and second grooves in the second side aligned with the second slots for a time period sufficient to singulate the dice.

115. (previously presented) The method of claim 114 further comprising following the etching step, forming a sealing layer on the second side and on edges of the dice.

116. (currently amended) The method of claim ~~114~~ 115 wherein the sealing layer comprises parylene.

117. (previously presented) The method of claim 114 further comprising forming contact bumps on the die contacts, forming the polymer layer on the die contacts,

and planarizing the contact bumps and the patterned polymer layer.

118. (currently amended) The method of claim 114 wherein the etching step is performed by submerging the substrate in a wet etchant.
~~using KOH in a first etch step, and TMAH in a second step.~~

119. (previously presented) The method of claim 114 wherein the forming the polymer layer step comprises depositing a curable polymer through a stencil.

120. (previously presented) The method of claim 114 wherein the forming the polymer layer step comprises depositing and etching a polymer material.

121. (currently amended) A method for fabricating semiconductor components comprising:

providing a plurality of semiconductor dice on a substrate having a first side, a second side, and a plurality of die contacts on the first side;

forming a plurality of contact bumps on the die contacts;

forming a polymer layer on the first side having a plurality of first slots in a criss cross pattern in which each die is enclosed by four slots;

planarizing the polymer layer and the contact bumps to a same surface;

forming an etch mask on the second side having a plurality of second slots aligned with the first slots;

forming a plurality of terminal contacts on the contact bumps;

etching the substrate from the first side and the second side at a same time forming first grooves in the first side aligned with the first slots and second grooves in the second side aligned with the second slots for a time

period sufficient to singulate and define edges of the dice; and

applying a coating to the edges and to the second side.

122. (previously presented) The method of claim 121 further comprising attaching a tape to the first side, and performing the etching step and the applying step with the tape covering the polymer layer and the contact bumps.

123. (previously presented) The method of claim 121 wherein the coating is configured to hermetically seal the second side and the edges.

124. (previously presented) The method of claim 121 wherein the terminal contacts comprise conductive bumps or balls.

125. (previously presented) The method of claim 121 wherein the forming the contact bumps step comprises attaching or depositing a solder material to the die contacts.

126. (previously presented) The method of claim 121 wherein the etching step is performed by submerging the substrate in a solution of KOH.

127. (previously presented) The method of claim 121 wherein the etching step is performed by submerging the substrate in a solution of TMAH.

128. (previously presented) The method of claim 121 wherein the substrate comprises a semiconductor wafer having streets separating the dice, and the first slots align with the streets.

129. (currently amended) A method for fabricating semiconductor components comprising:

providing a plurality of semiconductor dice on a substrate having a first side, a second side, and a plurality of die contacts on the first side;

forming a first polymer dam on the first side of the substrate configured to encircle at least some of the dice;

forming a plurality of contact bumps on the die contacts;

forming a polymer layer on the first side within the first polymer dam;

forming a second polymer dam on the first side configured to support peripheral areas of the substrate;

~~planarizing the polymer layer and the contact bumps to a same surface;~~

thinning the substrate from the second side;

forming a plurality of terminal contacts on the contact bumps; and

singulating the dice from the substrate.

130. (previously presented) The method of claim 129 further comprising following the thinning step applying a polymer tape to the second side.

131. (previously presented) The method of claim 130 wherein the polymer tape comprises a wafer level underfill material.

132. (previously presented) The method of claim 130 further comprising laser marking the polymer tape.

133. (previously presented) The method of claim 130 wherein the polymer tape is opaque to a radiation used for marking the polymer tape.

134. (previously presented) The method of claim 129 further comprising following the thinning step, attaching a heat sink to the second side.

135. (currently amended) The method of claim 129 wherein the first polymer dam encircles only the complete dice on the substrate.

~~forming the polymer layer step comprises forming a dam on the first side, depositing a curable material within the dam, and then curing the curable material.~~

136. (previously presented) The method of claim 129 further comprising testing the dice on the substrate prior to the singulating step.

137. (currently amended) A method for fabricating semiconductor components comprising:

providing a plurality of semiconductor dice on a substrate having a first side, a second side, and a plurality of die contacts on the first side;

forming a first polymer dam on the first side of the substrate configured to encircle at least some of the dice;

forming a second polymer dam on the first side configured to support peripheral areas of the substrate;

forming a polymer layer on the first side within the first polymer dam;

thinning the substrate from the second side;

singulating the dice from the substrate to form each component with a first side encapsulated by the polymer layer and a thinned second side; and

attaching a heat sink to the thinned second side.

138. (previously presented) The method of claim 137 further comprising forming a plurality of terminal contacts on the polymer layer in electrical communication with the die contacts.

139. (previously presented) The method of claim 137 further comprising forming a plurality of contact bumps on the die contacts encapsulated by the polymer layer.

140. (previously presented) The method of claim 137 wherein the singulating step is performed by sawing, laser cutting or liquid jet cutting the substrate.

141. (previously presented) The method of claim 137 wherein the attaching the heat sink step is performed using a thermally conductive adhesive.

142. (currently amended) A method for fabricating semiconductor components comprising:

providing a plurality of semiconductor dice on a substrate having a first side and a second side;

forming a plurality of trenches on the first side in a criss cross pattern between the dice;

forming a plurality of dams in the trenches comprising a first polymer material;

forming a plurality of polymer layers on the first side within the dams comprising a second polymer material;

thinning the substrate from the second side to expose the trenches; and

forming a plurality of grooves through the ~~polymer~~ dams to singulate the dice.

143. (previously presented) The method of claim 142 wherein the first polymer material comprises a photoimageable material.

144. (previously presented) The method of claim 142 wherein the first polymer material comprises a 3-D imageable material.

145. (previously presented) The method of claim 142 wherein the second polymer material comprises a silicone, a polyimide or an epoxy.

146. (previously presented) The method of claim 142 further comprising forming contact bumps on the dice within the polymer layers and forming terminal contacts on the contact bumps.

147. (previously presented) A method for fabricating semiconductor components comprising:

- providing a semiconductor substrate comprising a plurality of semiconductor dice and having a first side, a second side and a thickness;

- forming a plurality of trenches on the first side in a criss-cross pattern along peripheral edges of the dice, each trench having a depth less than the thickness;

- depositing an imageable polymer material on the first side and in the trenches;

- exposing and developing the imageable polymer material to form polymer dams in the trenches surrounding the dice;

- depositing a second polymer material on the dice within the polymer dams;

- thinning the substrate from the second side to expose the trenches; and

- singulating the dice through the polymer dams such that each component includes a semiconductor die having a surface covered by a portion of the second polymer material and edges covered by portions of the first polymer material.

148. (previously presented) The method of claim 147 wherein the imageable polymer material comprises a photoimageable resist.

149. (previously presented) The method of claim 147 wherein the imageable polymer material comprises a 3-D imageable material.

150. (previously presented) The method of claim 147 wherein the second polymer material has selected electrical characteristics.

151. (previously presented) The method of claim 147 further comprising providing the dice with a plurality of die contacts, forming contact bumps on the die contacts embedded in the second polymer material, and forming terminal contacts on the contact bumps.

Claims 152-260 (canceled)